



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/236,113	01/25/1999	XU SHI	1581.0250001	1912

7590

05/02/2003

STERNE KESSLER GOLDSTEIN & FOX
1100 NEW YORK AVENUE N W
SUITE 600
WASHINGTON, DC 200053934

EXAMINER

CANTELMO, GREGG

ART UNIT

PAPER NUMBER

1745

DATE MAILED: 05/02/2003

24

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/236,113

Applicant(s)

SHI ET AL.

Examiner

Gregg Cantelmo

Art Unit

1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 April 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 11-16 is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on April 16, 2003 has been entered.

Response to Amendment

2. In response to the amendment received April 16, 2003:
- a. Claims 17-25 have been cancelled. Claims 1-16 are pending;
 - b. The 102 and 103 rejections drawn to Semenyuk stand as set forth below.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claim 10 is rejected under 35 U.S.C. 102(b) as being anticipated by Semenyuk, of record and for the reasons of record.

Semenyuk discloses a cathodic arc source comprising: cathode , anode/ process chamber 2, means 5 for generating a magnetic field within chamber 2, cathode station for location of a target 1 in electrical contact with cathode, the target having front and rear surfaces, the magnetic field generating means 5 generates a magnetic field at the front surface of the target having a lateral field component effective to maintain the arc on the front surface of the target during operation (see Fig. 1 as applied to claim 10).

While intended use recitations and other types of functional language cannot be entirely disregarded. However, in apparatus, article, and composition claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the prior art. In re Casey, 370 F.2d 576, 152 USPQ 235 (CCPA 1967); In re Otto, 312 F.2d 937, 938, 136 USPQ 458, 459 (CCPA 1963).

Claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. In re Danly, 263 F.2d 844, 847, 120 USPQ 528, 531 (CCPA 1959). See also MPEP § 2114.

The manner of operating the device does not differentiate an apparatus claim from the prior art. A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural

limitations of the claim. Ex parte Masham, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987).

It is held that the magnetic field arrangement of Semenyuk, which provides an electromagnet 4 below the cathode emitting surface and an electromagnet 5 above the cathode emitting surface are positioned such that they are capable of generating the claimed magnetic field arrangement of claim 10 having a zero field strength at a position above the target and inside the chamber.

Response to Arguments

5. Applicant's arguments filed April 24, 2003 have been fully considered but they are not persuasive.

Applicant argues that the prior art teachings of Semenyuk does not disclose the particular magnetic field arrangement wherein a zero field strength is at a position above the target and inside the chamber.

The examiner respectfully disagrees.

Semenyuk's electromagnets are positioned in a manner identical to that of the instant invention with one electromagnet being positioned above the cathode emitting surface and the other electromagnet being positioned below the cathode emitting surface (Fig. 1).

While intended use recitations and other types of functional language cannot be entirely disregarded. However, in apparatus, article, and composition claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art

Art Unit: 1745

structure is capable of performing the intended use, then it meets the claim. In a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the prior art. In re Casey, 370 F.2d 576, 152 USPQ 235 (CCPA 1967); In re Otto, 312 F.2d 937, 938, 136 USPQ 458, 459 (CCPA 1963).

Claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. In re Danly, 263 F.2d 844, 847, 120 USPQ 528, 531 (CCPA 1959). See also MPEP § 2114.

The manner of operating the device does not differentiate an apparatus claim from the prior art. A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. Ex parte Masham, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987).

It is held that the magnetic field arrangement of Semenyuk, which provides an electromagnet 4 below the cathode emitting surface and an electromagnet 5 above the cathode emitting surface are positioned such that they are capable of generating the claimed magnetic field arrangement of claim 10 wherein a zero field strength can be positioned above the target and inside the chamber.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 1745

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Semenyuk in view of Falabella '363, all of record and for the reasons of record.

With respect to claim 1 Semenyuk discloses a cathode arc source comprising: cathode, anode/vacuum chamber 2, means for generating a magnetic field in the chamber having a direction normal to the front surface of the target and zero field strength positioned above the target within the chamber. The magnetic field is generated by a first field generating means 5 located above the target and second field generating means 4 located below the target (see Fig. 2b as applied to claim 1). The chamber is the anode (page 872, column 1, as applied to claim 2). The magnetic and electric fields within the system of Fig. 1 serve to confine the positive ions in a beam towards the substrate (as applied to claim 9).

The difference between the instant claims and Semenyuk is that Semenyuk does not disclose using a graphite cathode source (claim 1):

With respect to claims 3-8:

With respect to the particular field strengths of claims 3-8, such conditions are not held to be structural differences between the instant claimed apparatus and prior art apparatus. Note that Khominich uses adjustable power supplies to each coil. This

Art Unit: 1745

teaches of a cathode arc source wherein any desired field strengths can be selected to create a desired field pattern. Thus the null or zero field point can be adjusted in any number of ways, readily apparent to one of ordinary skill in the art. Since claims 3-8 do not structurally differentiate the instant apparatus and that of the prior art here, no patentable weight is accorded the desired fields strengths.

While intended use recitations and other types of functional language cannot be entirely disregarded. However, in apparatus, article, and composition claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the prior art. In re Casey, 370 F.2d 576, 152 USPQ 235 (CCPA 1967); In re Otto, 312 F.2d 937, 938, 136 USPQ 458, 459 (CCPA 1963).

Claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. In re Danly, 263 F.2d 844, 847, 120 USPQ 528, 531 (CCPA 1959). See also MPEP § 2114.

The manner of operating the device does not differentiate an apparatus claim from the prior art. A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. Ex parte Masham, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987).

The arc system is used for various materials (page 872, column 1, ll. 1-10). Selection of the particular cathode material is dependent upon the desired film to be coated onto a substrate.

Use of graphite cathode sources in cathode arc deposition is well known in the art as taught by Falabella '363 (col. 3, ll. 55-60) or the admitted prior art relied upon in the instant application (page 2, ll. 7-15).

The motivation for selection of graphite as the cathode source is to deposit carbon films onto the substrate.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Semenyuk by selecting the cathode to be a particular material, in the case of the instant claims, of graphite, since selection of a preferred material would have been an obvious design choice dependent upon the requisite coating to be applied to the substrate, graphite being a known source used as a cathode in cathodic arc sources. Selection of a known material on the basis of its suitability for the intended use has been held to be a matter of design choice. *In re Leshin* 125 USPQ 416.

Response to Arguments

8. Applicant's arguments filed April 24, 2003 have been fully considered but they are not persuasive.

Applicant argues that the combination fails to teach or suggest of a magnetic field wherein said magnetic field has a zero field strength at a position above the target and inside the chamber.

The Examiner respectfully disagrees for the reasons set forth in item 5 above, incorporated herein.

Applicant argues that replacing the metal target with a graphite target would result in an inoperative device. Applicant's position is not persuasive. First there still is no clear evidence as to the inoperative nature of such a replacement of the cathode material. Second the placement of the electromagnets of Semenyuk are identical to that of the instant invention, in that there is one electromagnet positioned above the cathode emitting surface and one electromagnet positioned below the cathode emitting surface (Fig. 1 of Semenyuk compared to Fig. 1 of the instant application). Thus upon replacing the cathode material of Semenyuk to be graphite, the electromagnetic configurations of the prior art and instant invention being identical, would appear to be capable of providing the same magnetic field configurations.

Applicant's argument is not persuasive. Applicant states arc spots tend to move slowly over graphite surfaces as opposed to metal surfaces and therefore substituting a graphite target would render the device inoperable because arcing would tend to stay close to the initial triggering point.

First it is not clear how Applicant concludes that because arc spots move slowly over graphite surfaces, the arc would stay close to the initial triggering point. A slow moving arc does not clearly mean that the arcing would tend to stay close to the initial

Art Unit: 1745

triggering point but rather that the arc would move slowly over the graphite surface.

Thus over time of operation a slow moving arc is expected to move albeit at a slower rate.

Second Applicants arguments do not persuade the Examiner that the combination is inoperable since their own argument seems to establish that an arc can be struck in an apparatus as shown by Semenyuk in view of Falabella '363, regardless of the rate the arc spot moves. Thus it would appear that the combination would in fact be operable, even if at a slower rate.

Allowable Subject Matter

9. Claims 11-16 are allowed.

10. The following is an examiner's statement of reasons for allowance:

none of the prior art of record is considered to teach, suggest or render obvious the invention of claim 11.

None of the prior art of record claims the method of claim 11 and in particular generating a first magnetic field below the target and a second magnetic field above the target, the second field having a direction opposite that of the first field so as to generate a resultant magnetic field from the first and second fields, wherein the resultant magnetic field has a direction substantially normal to a front surface of the target and a zero field strength at a position above the target and inside the chamber, and striking the arc in the resultant field.

While the claims apparatus is not held to be structurally different from the teachings of Semenyuk and Falabella '363, claims 11-16 are drawn to a method and therefore the manner of generating the magnetic field and location of the zero field are limitations which are significant to the process of operation and thus accorded patentable weight.

None of the prior art of record appears to teach, suggest or render obvious the magnetic field arrangement of claim 11.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Upon further consideration, there is no clear motivation for modifying the apparatus of Semenyuk with a macroparticle filter. For a more concise explanation see pages 9-10 of the amendment received April 24, 2003, incorporated herein.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregg Cantelmo whose telephone number is (703) 305-0635. The examiner can normally be reached on Monday through Thursday from 8:00 a.m. to 5:30 p.m. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan, can be reached on (703) 308-2383. FAX communications should be sent to the appropriate FAX number: (703) 872-9311 for

Art Unit: 1745

After Final Responses only; (703) 872-9310 for all other responses. FAXES received after 4 p.m. will not be processed until the following business day. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Gregg Cantelmo
Patent Examiner
Art Unit 1745

gc

A handwritten signature in black ink, appearing to read "Gregg Cantelmo", with a long horizontal flourish extending to the right.

April 30, 2003